

# ***STRATFORD***

***water pollution  
control plant***

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ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET, TORONTO 5

OFFICE OF THE GENERAL MANAGER

Members of the Stratford Local Advisory Committee,  
City of Stratford.

Gentlemen:

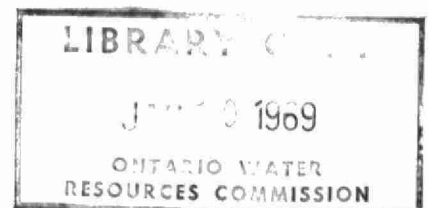
We are happy to present you with the 1967 Operating Summary for the  
Stratford Water Pollution Control Plant, OWRC Project No. 2-0002-57.

Your co-operation with our staff throughout the year has been appreciated.  
Only with such co-operation can the war against water pollution be waged  
effectively.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly".

D. S. Caverly,  
General Manager.





ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET  
TORONTO 5

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CHAIRMAN

J. H. H. ROOT, M.P.P.  
VICE-CHAIRMAN

TELEPHONE 365.

D. S. CAVERLY  
GENERAL MANAGER

W. S. MACDONNELL  
COMMISSION SECRETARY

General Manager,  
Ontario Water Resources Commission.

Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Stratford Water Pollution Control Plant, OWRC Project No. 2-0002-57.

The summary reviews progress during the year, outlines operating problems encountered and summarises in graphs, charts and tables all significant flow and cost data.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. A. McTavish".

D. A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.

## FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

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**STRATFORD**  
**water pollution control plant**

operated for

THE CITY OF STRATFORD

by the

ONTARIO WATER RESOURCES COMMISSION

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DIVISION OF PLANT OPERATIONS

DIRECTOR: D. A. McTavish

Assistant Director: C. W. Perry  
Regional Supervisor: A. C. Beattie  
Operations Engineer: B. W. Hansler

801 Bay Street Toronto 5

## **'67** REVIEW

The hydraulic loading on the plant increased considerably from 1966 to 1967. The plant design flow of 4 mgd was exceeded approximately 72 percent of the time, while the average daily flow increased from 3.07 mgd in 1966 to 4.35 mgd in 1967. The increased flows were accompanied by a decrease in organic loading of approximately 20 percent indicating that increased flows were due to storm flows or infiltration.

The contract for the installation of chlorination facilities at the WPCP has been let to Gaffney Construction Company Limited. It is expected that construction will commence in February 1968.

The total operating costs have increased approximately 9.3 percent from 1966 to 1967. However, because of the increased hydraulic loading, the cost per million gallons treated has decreased from \$52.77 to \$41.34. The cost per pound of BOD removed was similar to the 1966 cost of 2 cents per pound removed.



## PROJECT COSTS

NET CAPITAL COST (Estimated)	\$924,309.42
DEDUCT - Payments from Municipalities	<u>309.42</u>
Long Term Debt to OWRC	<u>\$925,000.00</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967	<u>\$214,829.62</u>
Debt Retirement	\$ 18,667.00
Reserve	4,663.44
Interest Charged	52,163.95
Net Operating	<u>65,593.65</u>
TOTAL	<u>\$141,088.04</u>

### RESERVE ACCOUNT

Balance at January 1, 1967	\$ 60,632.34
Deposited by Municipality	4,663.44
Interest Earned	<u>3,534.99</u>
	\$ 68,830.77
Less Expenditures	<u>-</u>
Balance at December 31, 1967	<u>\$ 68,830.77</u>

## MONTHLY OPERATING COSTS

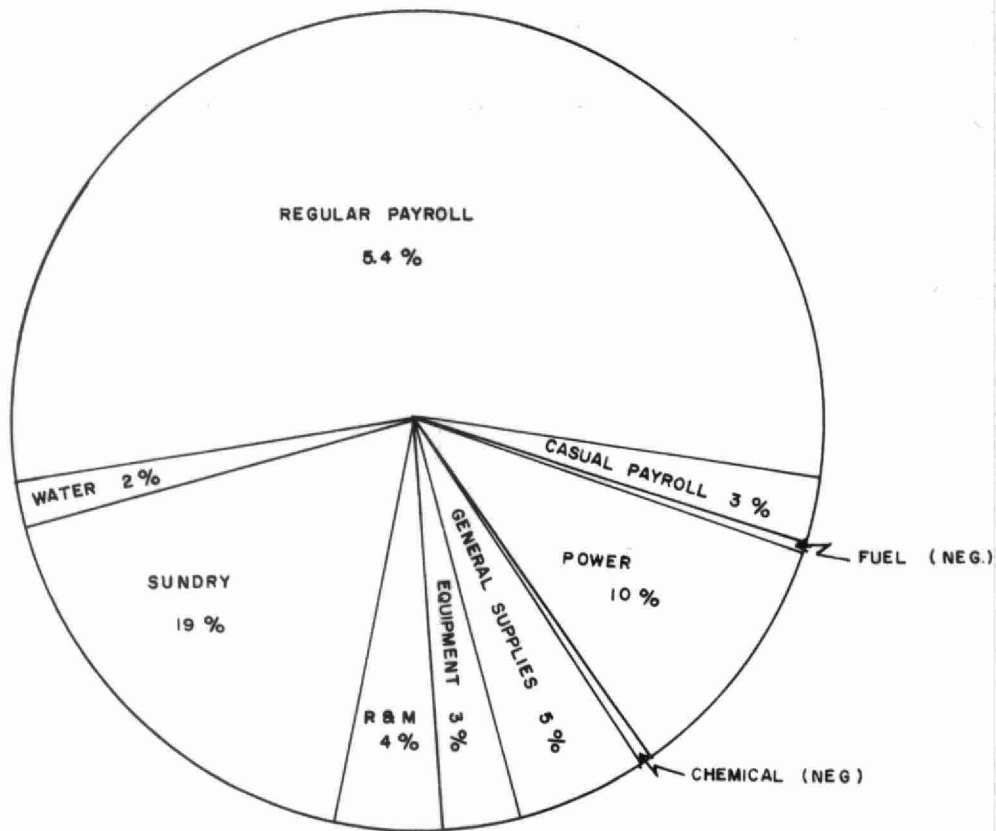
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	WATER
JAN	3,456.55	2563.29			635.03		150.46		5.10	30.11	12.10
FEB	4,105.11	2484.70			587.82		197.44	19.74	17.14	45.11	1.10
MARCH	6,613.51	4463.86			463.43		437.02	123.87	206.71	1002.59	14.10
APRIL	5,477.22	2723.72					256.54	6.32	520.62	132.70	132.83
MAY	3,777.02	2958.97			492.23		198.28	45.24		30.20	11.10
JUNE	6,319.04	2746.80	344.97	5.12			307.38	39.76	25.82	220.74	592.30
JULY	6,251.10	2739.06	305.21		572.23		223.05	468.42	52.06	845.73	63.40
AUG	5,212.57	2765.34	368.96		562.23	54.10	165.78		25.12	1184.62	63.40
SEPT	5,400.12	4081.51	484.51				127.00		225.57	525.40	634.03
OCT	5,734.68	2744.18	194.18				231.80	878.15	82.38	1018.76	565.27
NOV	7,150.03	2768.77			2267.52	53.38	265.26	235.00	1466.97	1753.02	(1673.80)
DEC	5,786.59	2733.14			1137.31		621.95		37.55	1149.64	106.60
TOTAL	65,593.15	35833.54	1097.85	5.12	6757.61	107.48	3206.96	1888.52	2673.16	12253.38	1191.93

\* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$9,351.30  
BRACKETS INDICATE CREDIT

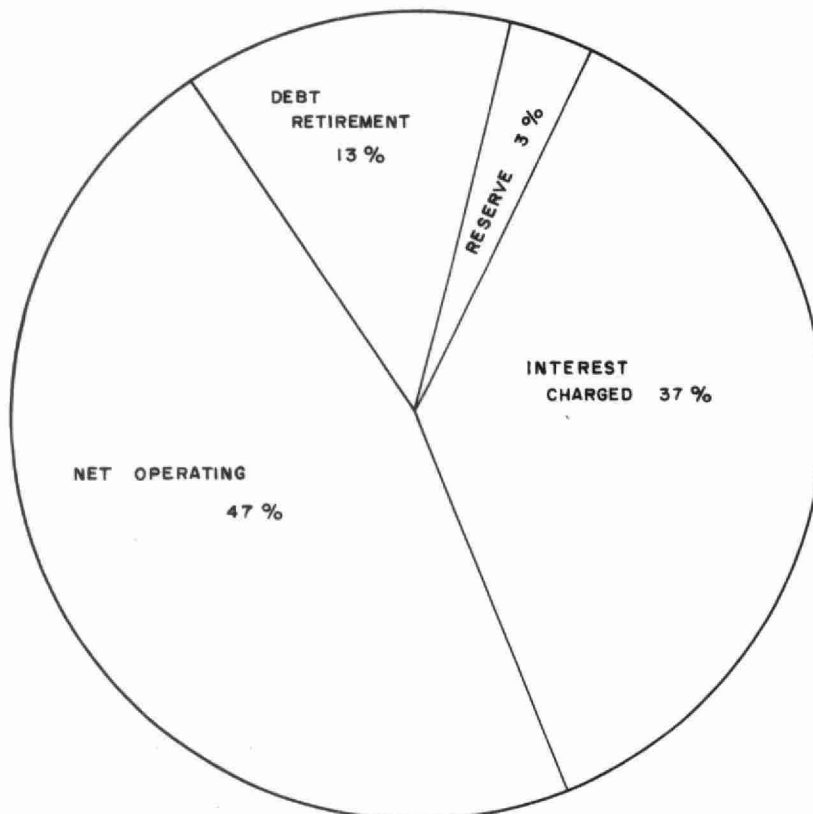
## YEARLY OPERATING COSTS

YEAR	M. G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1961	933.41	\$55015.86	\$58.94	2 CENTS
1962	765.39	48157.96	62.92	3 CENTS
1963	774.22	52799.80	68.15	3 CENTS
1964	994.33	53649.86	53.95	3 CENTS
1965	1142.53	57079.98	49.96	3 CENTS
1966	1120.84	59146.53	52.77	2 CENTS
1967	1566.59	65593.65	41.34	2 CENTS

## 1967 OPERATING COSTS



## TOTAL ANNUAL COST

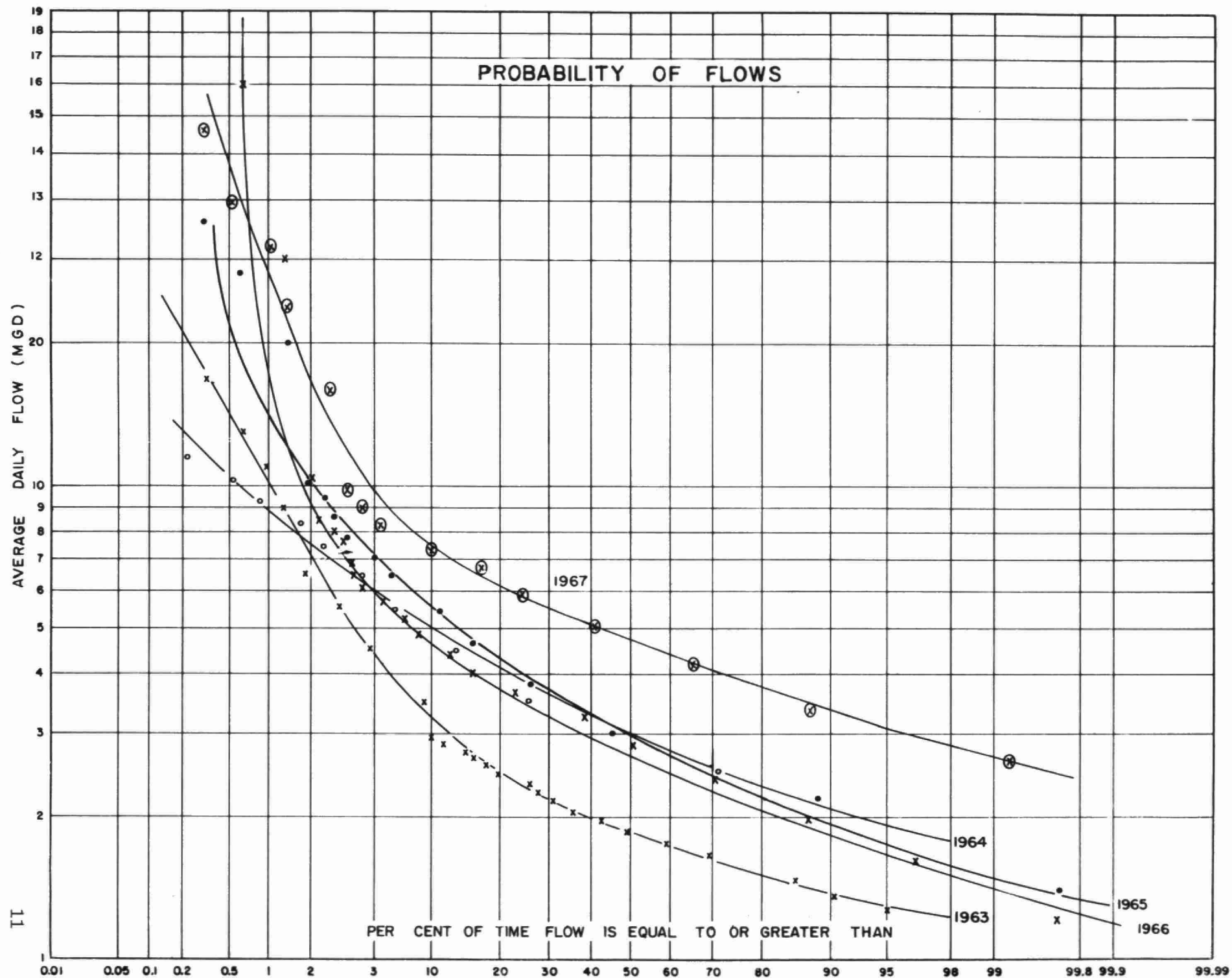


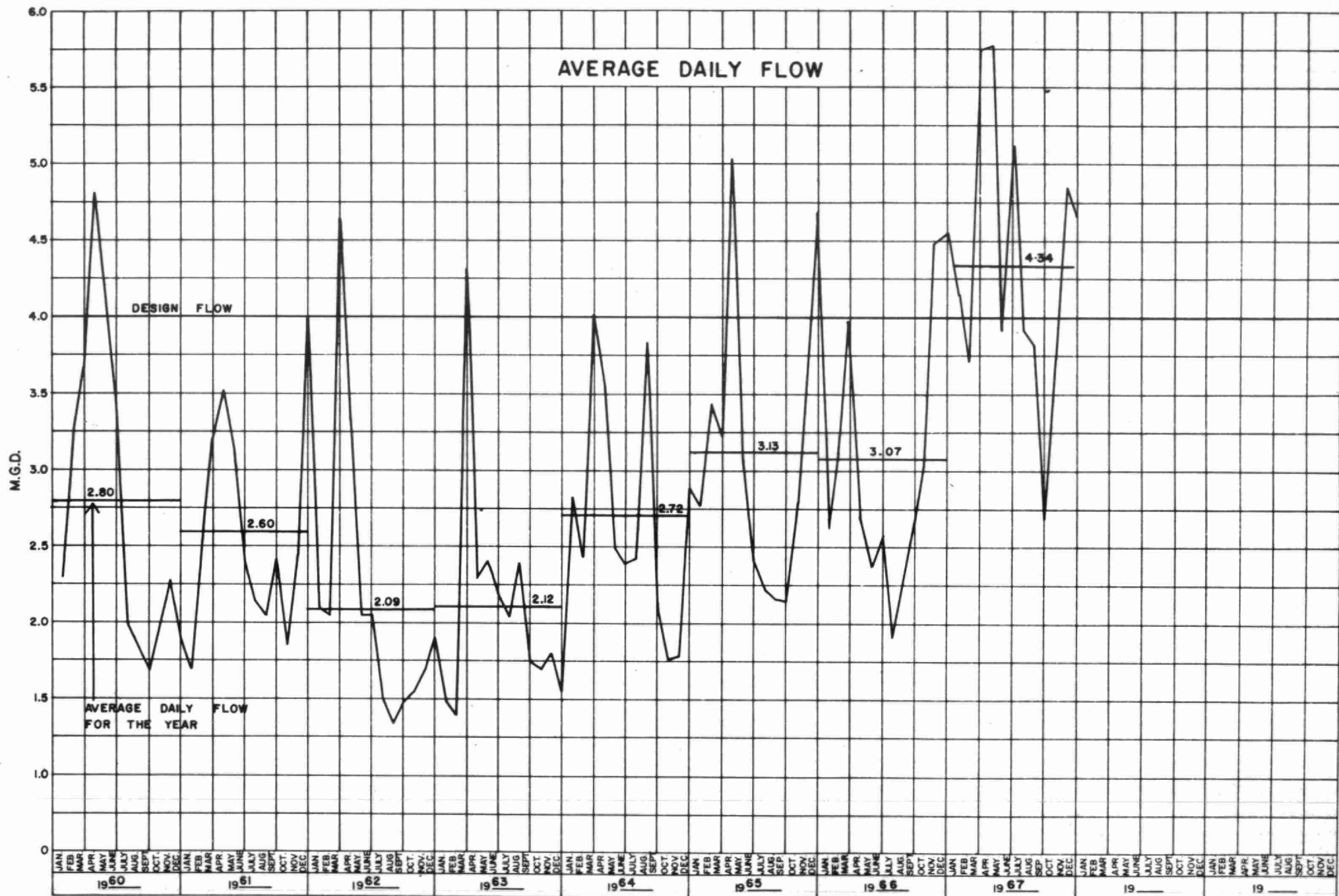
## Process Data

The average daily flow (4.35 mgd) has, for the first time, exceeded the design flow loading of the plant (4.0 mgd).

Peak flows were recorded in March, April, June and November coinciding with heavy rainfall periods during the year. Conversely, minimum flows were recorded in February, May, July, August and September - during periods of low rainfall.

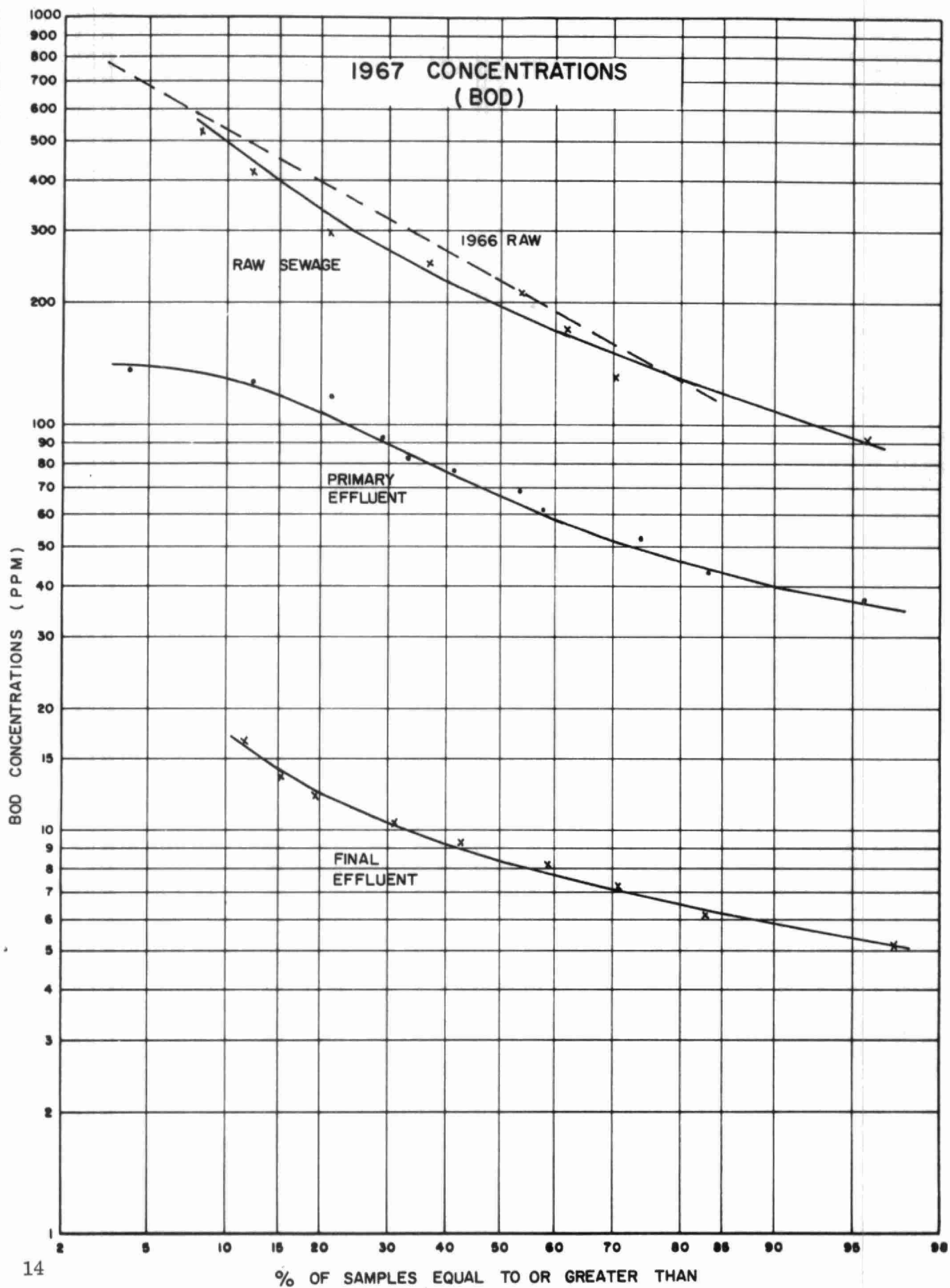
The design plant flow was exceeded approximately 72 percent of the time in 1967 and only 16 percent of the time in 1966. This is shown clearly in the probability of flow curves.



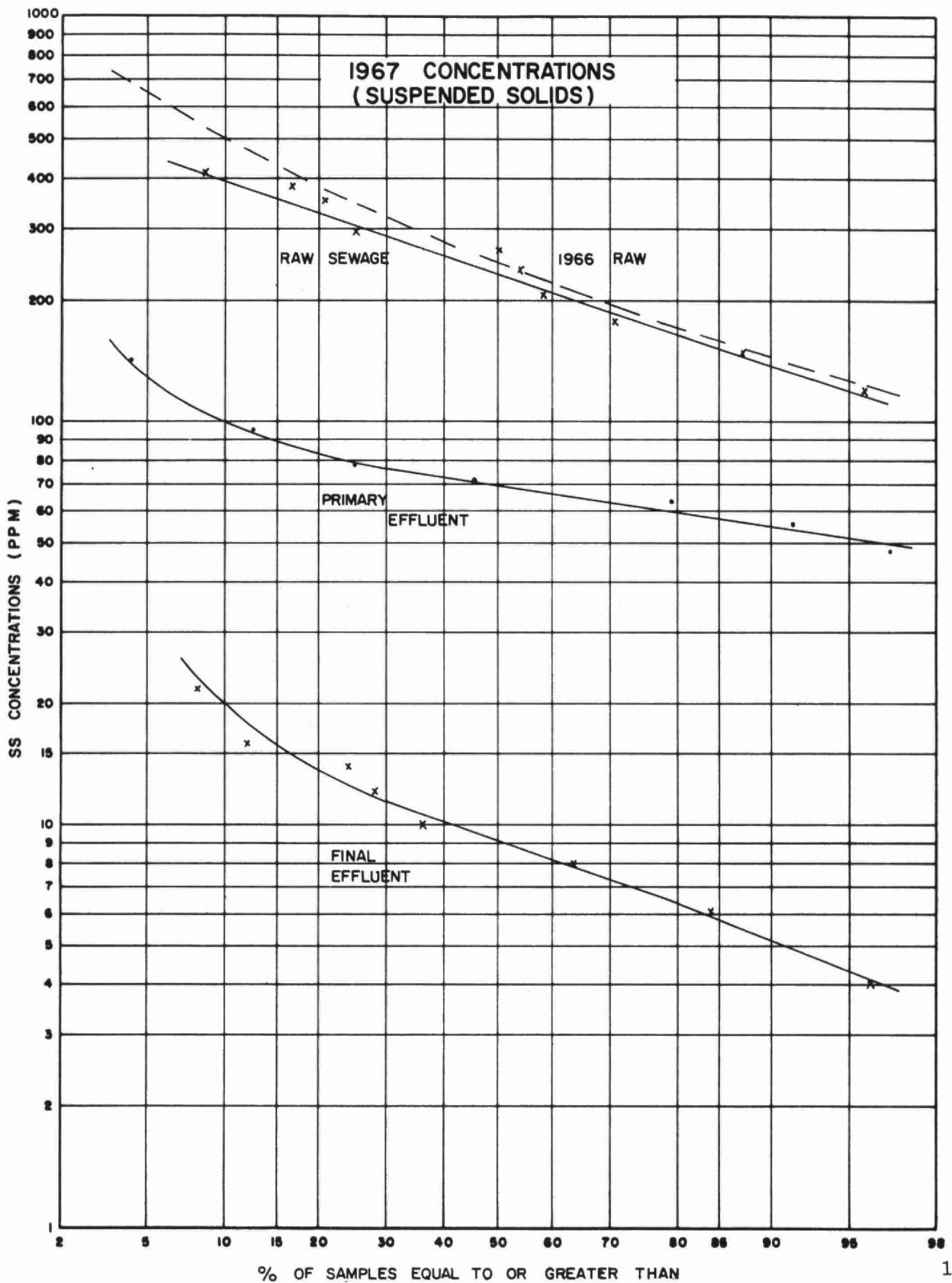


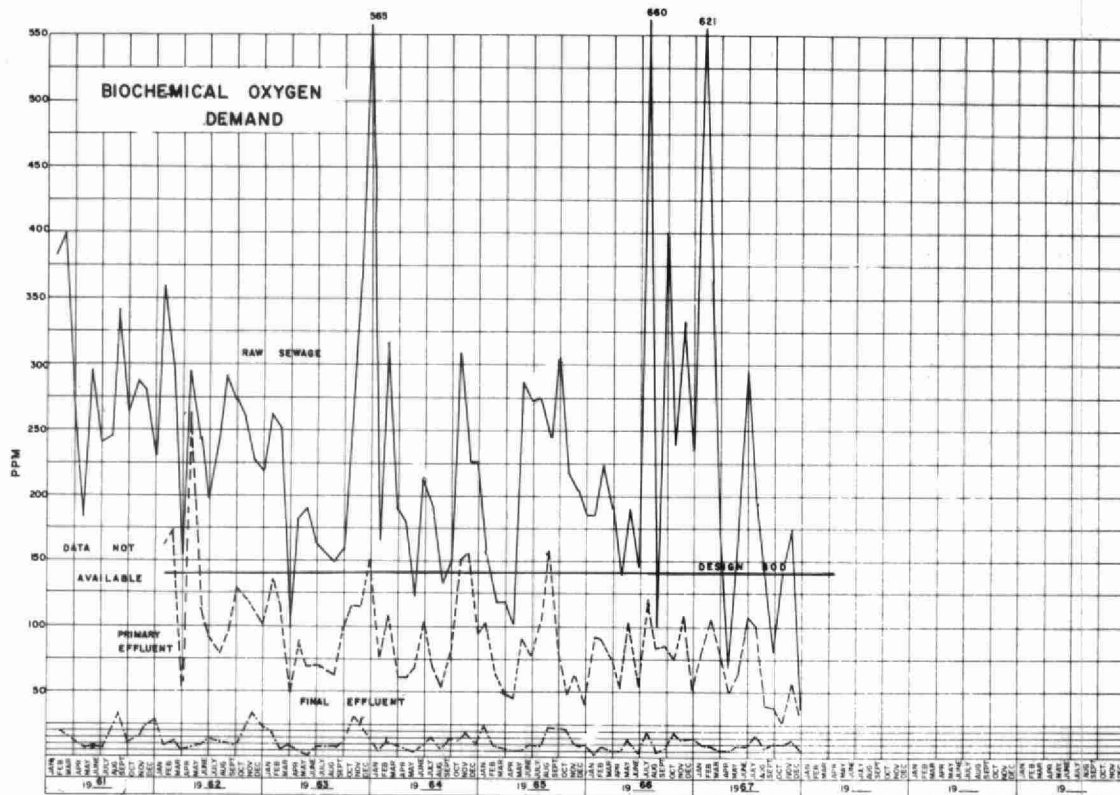
# FLOW DATA

Month	Total Flow ( MG )	Avg. Daily Flow (MGD)	Max. Daily Flow ( MG )	Min Daily Flow ( MG )
January	128.96	4.16	11.85	2.17
February	104.33	3.72	5.35	2.66
March	178.36	5.75	11.88	2.39
April	173.47	5.78	10.47	3.96
May	121.95	3.93	6.04	2.18
June	153.66	5.12	9.78	2.35
July	121.80	3.93	7.05	2.08
August	118.88	3.83	7.76	1.50
September	80.73	2.69	5.79	1.58
October	115.39	3.72	14.16	1.82
November	145.47	4.85	7.76	2.84
December	143.59	4.63	12.38	2.57
Total	1586.59			
Average	132.21	4.35		

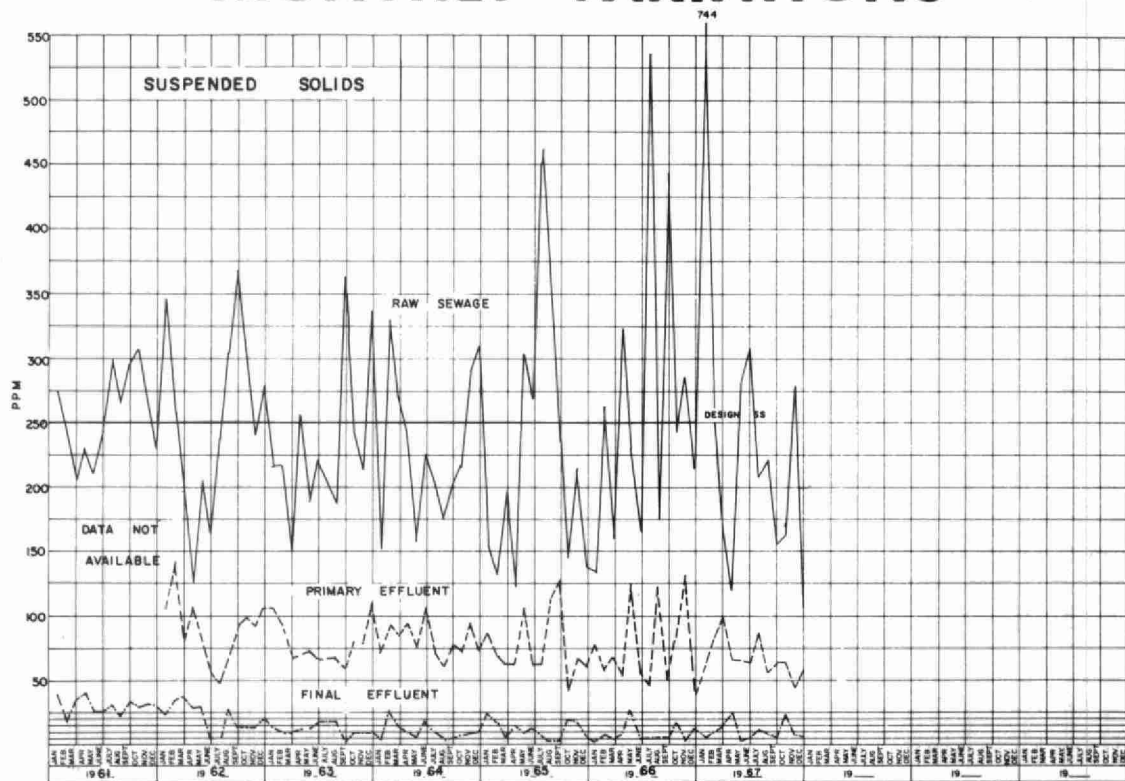








## MONTHLY VARIATIONS



# GRIT, B.O.D AND S.S. REMOVAL

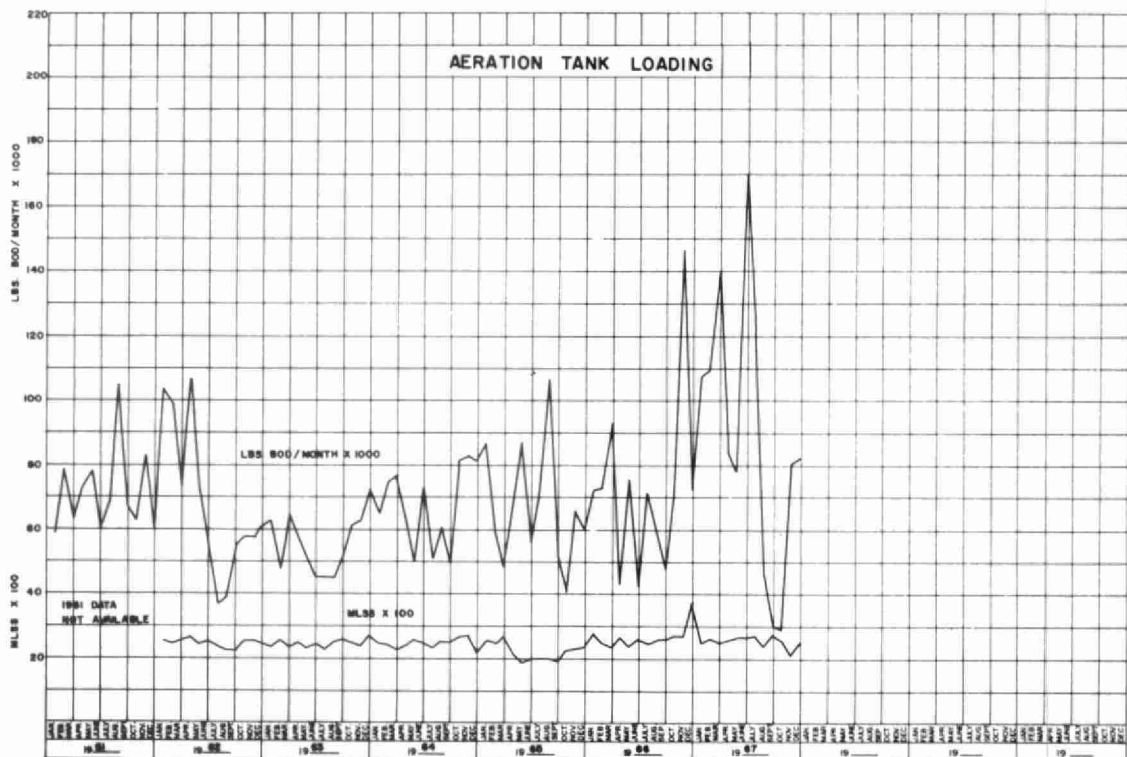
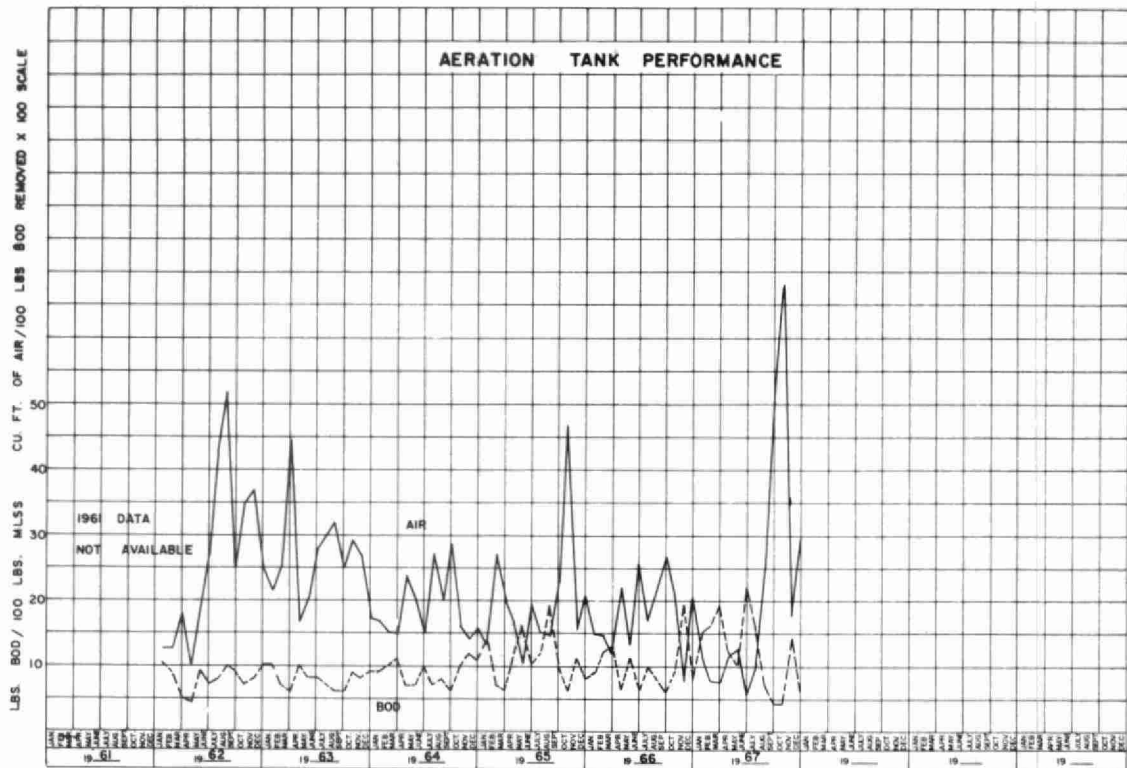
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MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	621	8	98.7	395.26	744	6	99.2	475.86	49
FEB.	364	6.6	98.2	186.44	262	10	96.2	131.46	20
MAR.	172	5	97.1	148.93	171	14	91.9	140.01	29
APR.	68	5	92.6	54.64	120	7.5	93.8	97.58	164
MAY	165	8.2	95.0	95.61	281	4.5	98.4	168.60	30
JUNE	295	8	97.3	220.50	309	7	97.7	232.03	55
JULY	194	16	91.8	108.40	208	12	94.2	119.36	25
AUG.	137	7.2	94.7	77.15	223	9	96.0	127.20	78
SEPT.	80	10	87.5	28.26	156	6	96.2	60.55	24
OCT.	141	10	92.9	75.58	164	24	85.4	80.77	157
NOV.	175	12.2	93.0	118.41	278	9	96.8	195.66	21
DEC.	39	6.7	82.8	23.19	107	7	93.4	71.80	106
TOTAL	-	-	-	1532.37	-	-	-	1900.88	758
AVG.	204	8.6	93.5	127.70	252	10	94.9	158.41	63

## COMMENTS

The average BOD loading to the plant decreased from 253 ppm in 1966 to 204 ppm in 1967, a reduction of 20 percent. The average suspended solids concentration decreased from 264 ppm to 252 ppm. The decrease in BOD and suspended solids is attributed to increased storm flows in 1967.

Although the BOD concentration of the influent is above its design loading of 140 ppm, the suspended solids concentration in the influent is near its design loading at 250 ppm. Both the average BOD and suspended solids of the final effluent were similar to the excellent effluent obtained in previous years averaging respectively 8.6 ppm and 10 ppm.



## AERATION SECTION

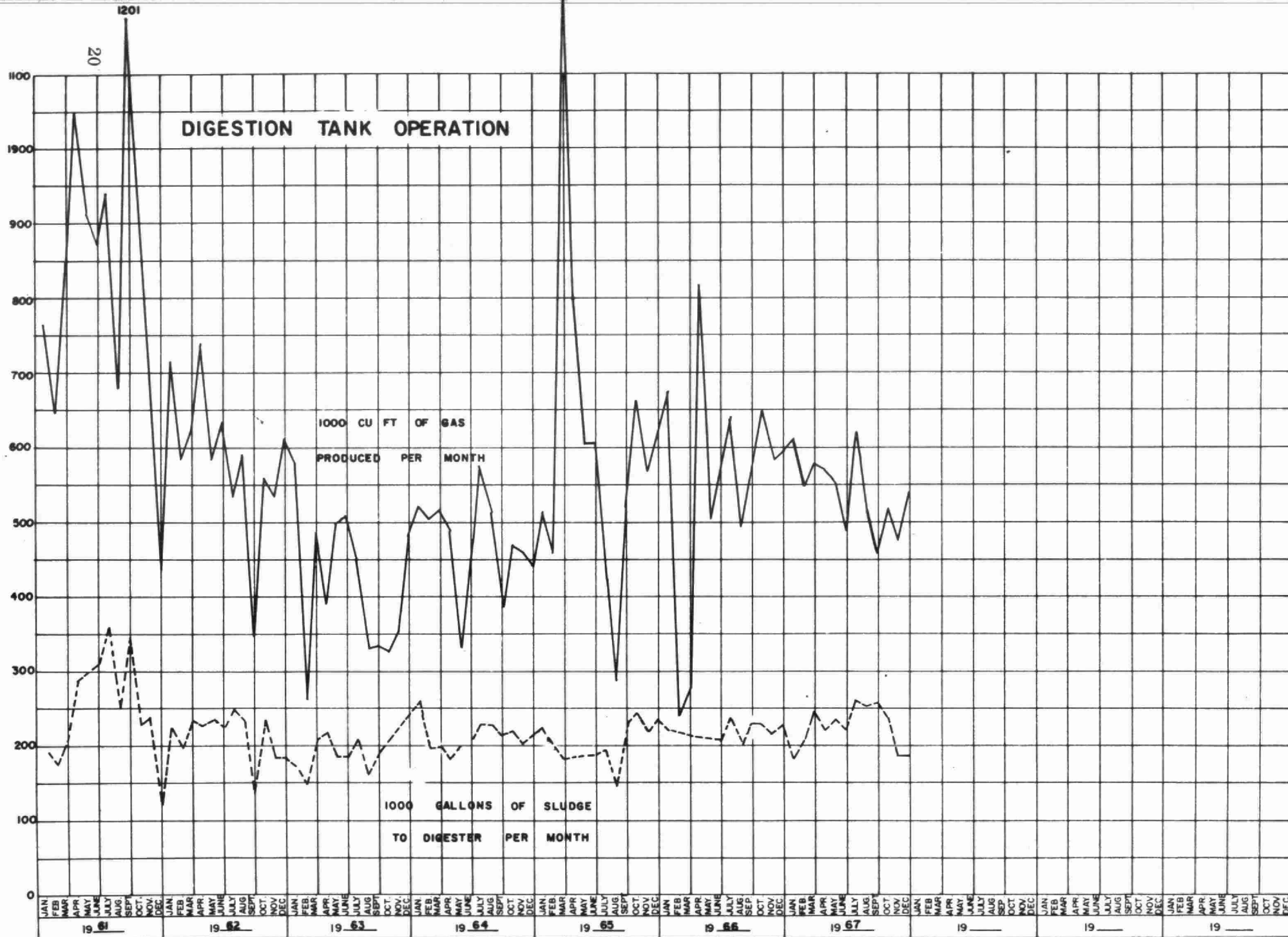
MONTH	PRIM. EFFL B.O.D. PPM.	ML.SS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	84	2492	15	1113
FEBRUARY	105	2617	16	783
MARCH	79	2516	19	722
APRIL	49	2581	12	1155
MAY	64	2647	10	1256
JUNE	108	2646	22	546
JULY	100	2682	16	938
AUGUST	39	2408	7	2496
SEPTEMBER	37	2714	4	5041
OCTOBER	25	2593	4	6778
NOVEMBER	56	2148	14	1780
DECEMBER	34	2527	6	2914
TOTAL	-	-	-	-
AVERAGE	65	2548	12	2127

### COMMENTS

The loading to the aeration section averaged 12 pounds of BOD per 100 pounds of MLSS. Design loading criteria for an activated sludge plant varies from 25 to 50 pounds of BOD per 100 pounds MLSS and the mixed liquor generally requires from 500 to 700 cubic feet of air per pound of BOD removed. Because of the low loadings to the aeration section, considerable nitrification takes place resulting in tremendous air requirements per pound of BOD removed. An average of 2,127 cubic feet of air was required to remove one pound of BOD in the Stratford plant.

Since the process produced an excellent effluent the fact that considerably more air than usual was required can be ignored in the overall plant operation.

# DIGESTION TANK OPERATION



## DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	GALLONS	% SOLIDS	% VOL. MAT	GALLONS	% SOLIDS	% VOL. MAT	
JAN.	182,061	4.9	73	183,980	4.0	71	609.572
FEB.	208,377	5.3	69	135,120	3.6	65	546.639
MAR.	248,123	5.3	74	319,607	3.5	64	579.722
APR.	221,623	6.8	70	181,622	3.9	63	571.297
MAY	235,476	5.6	65	379,628	4.4	51	555.937
JUNE	222,993	6.3	63	106,142	4.5	57	490.228
JULY	260,925	6.8	60	267,556	4.5	48	621.266
AUG.	255,111	6.6	59	228,795	4.6	51	517.738
SEPT.	258,031	6.2	57	247,667	4.5	50	459.734
OCT.	239,563	6.9	68	198,133	4.6	58	520.335
NOV.	187,692	6.0	67	132,089	4.3	60	479.187
DEC.	185,245	7.1	71	136,807	4.2	50	539.352
TOTAL	2,705,220	-	-	2,517,146	-	-	6490.967
AVG.	225,435	6.2	66	209,762	4.2	57	540.914

### COMMENTS

The volatile solids reduction was similar to last year's reduction at 38 percent. Gas production dropped from a monthly average of 570,530 cubic feet to 540,910 cubic feet. The percent total solids in the raw sludge and digested sludge was similar to that of last year's at approximately 6.0 percent and 4.2 percent respectively.

Date Due

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## **CONCLUSIONS**

The plant once again produced an excellent final effluent with BOD and suspended solids concentrations well below the OWRC objectives. A considerable increase in hydraulic loading resulted in the plant design flow being exceeded approximately 72 percent of the time. However, because of excellent operation, the quality of the final effluent had not deteriorated over previous years.

## **RECOMMENDATIONS**

The increased flows to the plant during the year can be attributed to the heavy rainfall. The city should make every effort to reduce the amount of stormwater reaching the sanitary sewer system.

Expansion of the plant should be expedited to ensure that the necessary facilities are available when required.

